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BACON & THOMAS, PLLC
625 SLATERS LANE
FOURTH FLOOR
ALEXANDRIA, VA 22314

EXAMINER	
RASHID, DAVID	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/761,193	JEONG ET AL.	
	Examiner	Art Unit	
	David P. Rashid	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 October 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

All of the examiner's suggestions presented herein below have been assumed for examination purposes, unless otherwise noted.

Amendments

1. This office action is responsive to the claim and specification amendment received on 10/17/2007. **Claims 1 – 15** remain pending.

Claim Rejections - 35 USC § 112

2. In response to applicant's claim 35 USC § 112 rejections amendments and remarks received on 10/17/2007, the previous claim 35 USC § 112 rejections are withdrawn.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Section IV.C, reads as follows:

> While abstract ideas, natural phenomena, and laws of nature are not eligible for patenting, methods and products employing abstract ideas, natural phenomena, and laws of nature to perform a real-world function may well be. In evaluating whether a claim meets the requirements of section 101, the claim must be considered as a whole to determine whether it is for a particular application of an abstract idea, natural phenomenon, or law of nature, rather than for the abstract idea, natural phenomenon, or law of nature itself.
>
> For claims including such excluded subject matter to be eligible, the claim must be for a practical application of the abstract idea, law of nature, or natural phenomenon. Diehr, 450 U.S. at 187, 209 USPQ at 8 ("application of a

> law of nature or mathematical formula to a known structure or process may well be deserving of patent protection."); Benson, 409 U.S. at 71, 175 USPQ at 676 (rejecting formula claim because it "has no substantial practical application").
>
> To satisfy section 101 requirements, the claim must be for a practical application of the Sec. 101 judicial exception, which can be identified in various ways:
>
> > The claimed invention "transforms" an article or physical object to a different state or thing.
> >
> > The claimed invention otherwise produces a useful, concrete and tangible result, based on the factors discussed below.

5. **Claims 1-15** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. **Claims 1-15** recites the mere manipulation of data or an abstract idea, or merely solves a mathematical problem without a limitation to a practical application. A practical application exists if the *result* of the claimed invention is "useful, concrete and tangible" (with the emphasis on "result")(Guidelines, section IV.C.2.b). A "useful" result is one that satisfies the utility requirement of section 101, a "concrete" result is one that is "repeatable" or "predictable", and a "tangible" result is one that is "real", or "real-world", as opposed to "abstract" (Guidelines, section IV.C.2.b)). **Claims 1-15** are rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter because the claimed invention is directed to a judicial exception and is not directed to a practical applicant of such judicial exception (though the claims produce what is considered a useful and concrete result, the claims do not require any physical transformation and the invention does not produce a tangible result). MPEP SECTION 2106 (IV)(C)(2)(b)(2) titled "TANGIBLE RESULT" reads as follows:

> ...the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.").

For example, the system of independent claim 1 is directed to the actions of "converting...image[s]" and "comparing...scan line[s]" which could all be done on a hardware implementation free from any "real-world result" as there could exist no real-world application.

In order to for the claimed product to produce a "useful, concrete and tangible" result, recitation of one or more of the following elements is suggested:

- The manipulation of data that represents a physical object or activity transformed from outside the computer.
- A physical transformations outside the computer, for example in the form of pre or post computer processing activity.
- A direct recitation of a practical application;

Applicant is also advised to provide a written explanation of how and why the claimed invention (either as currently recited or as amended) produces a useful, concrete and tangible result.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 1-2** and **14** are rejected under 35 U.S.C. 102(b) as being anticipated by Oh (US 2002/0012459 A1).

Regarding **claim 1**, Oh discloses a multi-layered real-time stereo matching system (FIG. 9A; FIG. 12) comprising:

a left and a right image acquisition means ("a camera for taking the scanning image...the other camera for taking the reference image" in paragraph 0004) for obtaining a left and a right image ("scanning image" and "reference image" in paragraph 0004) on a spatial area from different position (paragraph 0004);

an image processing unit (the unit responsible for creating the digital images as disclosed by Oh) for converting the left and the right image to a left and a right digital image (FIG. 9 are digital images; paragraph 0001); and

a multi-layered image matching means (the processor responsible for execution of FIG. 9B; "processor" in paragraph 0068), which includes a systolic array ("systolic array" in paragraph 0084; FIG. 9; FIG. 12), for comparing one scan line (R_1 in FIG. 9B) in one of the left and the right digital image ("Reference Image" in FIG. 9A) with multiple scan lines ($L_1 \ldots L_{64}$ in FIG. 9B) in the other of the left and the right digital image ("Scanning Image" in FIG. 9B) in real-time by using the systolic array so that each pixel in the one scan line matches another pixel in the multiple scan lines in the other digital image ("65th Calculation" in FIG. 9B; paragraph 0084).

Regarding **claim 2**, Oh discloses the system of claim 1, wherein the multi-layered image matching means (the processor responsible for execution of FIG. 9B; "processor" in paragraph 0068) receives pixels of the one scan line (R_1 in FIG. 9B) in the one digital image sequentially

and receives pixels of the multiple scan lines ($L_1 \ldots L_{64}$ in FIG. 9B) in the other digital image at a time, and calculates a disparity between one pixel in the one scan line and said another pixel in the multiple scan lines ("stereo disparity" in paragraph 0007).

Regarding **claim 14**, Oh discloses a multi-layered real-time stereo matching method (FIG. 9B) , the method comprising the steps of:

(a) obtaining a left and a right digital image on a spatial area ("a camera for taking the scanning image...the other camera for taking the reference image" in paragraph 0004);

(b) comparing one scan line (R_1 in FIG. 9B) in one digital image ("Reference Image" in FIG. 9B) of the left and the right digital image with multiple scan lines ($L_1 \ldots L_{64}$ in FIG. 9B) in the other digital image ("Scanning Image" in FIG. 9B) in a real-time by using a systolic array ("systolic array" in paragraph 0084; FIG. 9; FIG. 12) to match each pixel in the one scan line with a pixel in the multiple scan lines ("65th Calculation" in FIG. 9B; paragraph 0084).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. **Claims 3-5** and **7-9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh (US 2002/0012459 A1) in view of Jeong et al. (US 2002/0025075 A1).

Regarding **claim 3**, while Oh discloses the system of claim 2, and while Oh teaches wherein the multi-layered image matching means (the processor responsible for execution of

FIG. 9A; "processor" in paragraph 0068) includes: a plurality of layers (each layer being what has been calculated (e.g. "To 2nd Strip REG", "To 3rd Strip REG", and so forth)) for receiving the one scan line (R_1 in FIG. 9B) in the one digital image ("Reference Image" in FIG. 9B) and receiving the multiple scan lines ($L_1 \ldots L_{64}$ in FIG. 9B) in the other digital image ("Scanning Image" in FIG. 9B) one by one, Oh does not disclose wherein two adjacent layers exchange costs and active signals with each other; and an accumulator for accumulating data fed from the layers to generate the disparity.

Jeong teaches wherein the multi-layered image matching means (FIG. 1, element 13) includes:

wherein two adjacent layers (the two layers as input in FIG. 4) exchange costs and active signals with each other (FIG. 4, element 44; "matching cost based on a pair of pixels in one scan line of the first and second digital image signals" in paragraph 0009); and

an accumulator (FIG. 4, element 43) for accumulating data fed from the layers to generate the disparity (output in FIG. 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for the multi-layered image matching means and systolic array of Oh to include wherein two adjacent layers exchange costs and active signals with each other; and an accumulator for accumulating data fed from the layers to generate the disparity as taught by Jeong "to provide a real-time stereo image matching system which enables real-time stereo matching, by parallel processing video image sequences using an algorithm which is based on a new trellis based method and is optimal in the Bayesian sense.", Jeong, paragraph [0008].

Regarding **claim 4**, while Oh in view of Jeong discloses the system of claim 3, and while Oh discloses wherein each of the layers has: a first storing means (it is inherent if not already implicit that there must be a computer storage/memory of the image for it to be computed in FIG. 9B) for storing pixels of the left digital image ("Reference Image" in FIG. 9B); and a second storing means (it is inherent if not already implicit that there must be a computer storage/memory of the image for it to be computed in FIG. 9B) for storing pixels of the right digital image ("Scanning Image" in FIG. 9B), Oh does not disclose having a plurality of forward processors, stacks and backward processors for generating decision values and the disparity obtained from the left and the right digital image based on a clock signal.

Jeong discloses a system for matching stereo image in real time (FIG. 1) that includes wherein each scan line has:

a first storing means (FIG. 1, element 12) for storing pixels of the left digital image ("Lin" in FIG. 3);

a second storing means (FIG. 1, element 12) for storing pixels of the right digital image ("Rin" in FIG. 3); and

a forward processor (FIG. 3, element 30), stack (FIG. 3, element 31) and backward processor (FIG. 3, element 32) for generating decision values ("decision value" in paragraph [0023]) and the disparity ("disparity" in paragraph [0023]) obtained from the left and the right digital image based on a clock signal ("Clock" in FIG. 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for each layer of Oh in view of Jeong to include having a forward processor, stack and backward processor for generating decision values and the disparity obtained from the left and

the right digital image based on a clock signal (thus a plurality of forward processors, stacks and backward processors for all layers) as taught by Jeong "to provide a real-time stereo image matching system which enables real-time stereo matching, by parallel processing video image sequences using an algorithm which is based on a new trellis based method and is optimal in the Bayesian sense.", Jeong, paragraph [0008].

Regarding **claim 5**, while Oh in view of Jeong disclose the system of claim 4, Oh does not teach wherein each of the forward processors of said each of the layers contains: a first multiplexor for determining a minimum cost among a recursive cost within said each of the forward processors and two costs fed from an upper and a lower layer of said each of the layers; a first cost register for storing the minimum cost; an absolute value calculator for calculating as a matching cost a difference between one of the pixels of the first image storing means and another pixel of the pixels of the second image storing means; a first adder for adding the matching cost to the minimum cost to generate a first added cost, a second multiplexor for deciding a minimum cost among the first added cost and two costs fed from an upper and a lower forward processor in said each of the layers; a second cost register for storing the minimum cost fed from the second multiplexor, wherein the minimum cost is fed back to the first cost multiplexor as the recursive cost and also provided to the upper and the lower layer; and a second adder for adding the minimum cost stored in the second cost register to an occlusion cost to provide a second added cost to the upper and the lower forward processor.

Jeong discloses a system for matching stereo image in real time (FIG. 1) that includes wherein each of the forward processors (FIG. 3, element 30; FIG. 2, element 22) of each scan line contains:

a first multiplexor (FIG.5, element 43) for determining a minimum cost among a recursive cost within said each of the forward processors and two costs fed from an upper and a lower layer of said each scan line (paragraphs [0025], [0027]);

a first cost register (FIG. 4, element 44) for storing the minimum cost (paragraph [0025]);

an absolute value calculator (FIG. 4, element 41) for calculating as a matching cost a difference between one of the pixels of the first image storing means and another pixel of the pixels of the second image storing means (paragraph [0025]);

a first adder (FIG. 4, element 42) for adding the matching cost to the minimum cost to generate a first added cost (paragraph [0025]);

a second multiplexor (FIG. 4, element 43) for deciding a minimum cost among the first added cost and two costs ("Uin2" and "Uin1" in FIG. 4) fed from an upper and a lower forward processor in said each of the layers (paragraphs [0045], [0046]);

a second cost register (FIG. 4, element 44) for storing the minimum cost fed from the second multiplexor, wherein the minimum cost is fed back to the first cost multiplexor as the recursive cost and also provided to the upper and the lower layer (paragraph [0047]); and

a second adder (FIG. 4, element 42) for adding the minimum cost stored in the second cost register to an occlusion cost to provide a second added cost to the upper and the lower forward processor (paragraph [0045]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for each layer of Oh in view of Jeong to include wherein each of the forward processors of said each of the layers contains: a first multiplexor for determining a minimum cost among a recursive cost within said each of the forward processors and two costs fed from an

upper and a lower layer of said each of the layers; a first cost register for storing the minimum cost; an absolute value calculator for calculating as a matching cost a difference between one of the pixels of the first image storing means and another pixel of the pixels of the second image storing means; a first adder for adding the matching cost to the minimum cost to generate a first added cost, a second multiplexor for deciding a minimum cost among the first added cost and two costs fed from an upper and a lower forward processor in said each of the layers; a second cost register for storing the minimum cost fed from the second multiplexor, wherein the minimum cost is fed back to the first cost multiplexor as the recursive cost and also provided to the upper and the lower layer; and a second adder for adding the minimum cost stored in the second cost register to an occlusion cost to provide a second added cost to the upper and the lower forward processor as taught by Jeong "to provide a real-time stereo image matching system which enables real-time stereo matching, by parallel processing video image sequences using an algorithm which is based on a new trellis based method and is optimal in the Bayesian sense.", Jeong, paragraph [0008].

Regarding **claim 7**, Oh discloses wherein each of the layers (each layer being what has been calculated (e.g. "To 2nd Strip REG", "To 3rd Strip REG", and so forth)) is inputted with pixels (the respective pixels in FIG. 9B) of one scan line (R_1 in FIG. 9B) of the one digital image ("Reference Image" in FIG. 9B) and pixels (the respective pixels in FIG. 9B) of multiple scan lines ($L_1 \ldots L_{64}$ in FIG. 9B) of the other digital image ("Scanning Image" in FIG. 9B).

Regarding **claim 8**, while Oh in view of Jeong disclose the system of claim 5, Oh does not disclose wherein all the cost registers except a 0-th cost register in the forward processors in

said each of the layers is initialized with maximum cost, respectively, and the second storing means is initialized based on the right digital image.

Jeong discloses a system for matching stereo image in real time (FIG. 1) that includes wherein all the cost registers except a 0-th cost register in the forward processors in said each of the layers is initialized with maximum cost, respectively, and the second storing means is initialized based on the right digital image (paragraph [0039]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for each layer of Oh in view of Jeong to include wherein all the cost registers except a 0-th cost register in the forward processors in said each of the layers is initialized with maximum cost, respectively, and the second storing means is initialized based on the right digital image as taught by Jeong "to provide a real-time stereo image matching system which enables real-time stereo matching, by parallel processing video image sequences using an algorithm which is based on a new trellis based method and is optimal in the Bayesian sense.", Jeong, paragraph [0008].

Regarding **claim 9**, while Oh in view of Jeong disclose the system of claim 5, Oh does not teach wherein,

if a sum of a processing element number and a forward processing step number is an even number, said each of the forward processors decides a minimum cost among the recursive cost and two added costs obtained by adding the occlusion cost to said two costs fed from the upper and the lower forward processor in said each of the layers, respectively, to provide the minimum cost as a first decision value to a stack,

and, if otherwise, said each of the forward processors determines another minimum cost among a cost obtained by adding an absolute pixel difference of the left and the right digital

image to the first decision value and two costs of two forward processors of the upper and the lower layer to provide the minimum cost as a second decision value to the stack.

Jeong discloses a system for matching stereo image in real time (FIG. 1) that includes wherein

if a sum of a processing element number and a forward processing step number is an even number, said each of the forward processors decides a minimum cost among the recursive cost and two added costs obtained by adding the occlusion cost to said two costs fed from the upper and the lower forward processor in said each of the layers, respectively, to provide the minimum cost as a first decision value to a stack (paragraphs [0036], [0037]; "If i + j is even" and its full condition in paragraph [0063]),

and, if otherwise, said each of the forward processors determines another minimum cost among a cost obtained by adding an absolute pixel difference of the left and the right digital image to the first decision value and two costs of two forward processors of the upper and the lower layer to provide the minimum cost as a second decision value to the stack (paragraphs [0036], [0037]; "If i + j is odd" and its full condition in paragraph [0063]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for each layer of Oh in view of Jeong to include wherein, if a sum of a processing element number and a forward processing step number is an even number, said each of the forward processors decides a minimum cost among the recursive cost and two added costs obtained by adding the occlusion cost to said two costs fed from the upper and the lower forward processor in said each of the layers, respectively, to provide the minimum cost as a first decision value to a stack, and, if otherwise, said each of the forward processors determines another

minimum cost among a cost obtained by adding an absolute pixel difference of the left and the right digital image to the first decision value and two costs of two forward processors of the upper and the lower layer to provide the minimum cost as a second decision value to the stack as taught by Jeong "to provide a real-time stereo image matching system which enables real-time stereo matching, by parallel processing video image sequences using an algorithm which is based on a new trellis based method and is optimal in the Bayesian sense.", Jeong, paragraph [0008].

10. **Claim 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Oh (US 2002/0012459 A1) in view of Onda (US 5,867,591 A).

Regarding **claim 15**, while Oh discloses the system of claim 14, Oh does not disclose wherein the step (b) includes the steps of: (b1) determining a path of a minimum cost as a decision value based on pixel data of the one scan line and pixel data of the multiple scan lines; (b2) calculating a disparity from the decision value; and (b3) using the disparity to find a pair of pixels from the left and the right digital image and calculating a distance from the disparity.

Onda discloses wherein the step (b) includes the steps of:

(b1) determining a path of a minimum cost as a decision value ("disp1" and "disp2" in FIG. 18; Col. 14, lines 23 – 31) based on pixel data of the one scan line (pixels in "left window TLk(x,y)" in FIG. 17) and pixel data of the multiple scan lines (pixels in "right window TRk(x,y)" in FIG. 17; right window in FIG. 16, element TR1; Col. 6, lines 29 – 40);

(b2) calculating a disparity ("identify most-frequent-valued block as true disparity" in FIG. 19; Col. 15, lines 35 – 51) from the decision value; and

(b3) using the disparity to find a pair of pixels from the left and the right digital image and calculating a distance from the disparity (once the block disparity is found, the distance between the right and left windows is itself "disp" as shown in FIG. 16).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for step (b) of Oh to include the steps of: (b1) determining a path of a minimum cost as a decision value based on pixel data of the one scan line and pixel data of the multiple scan lines; (b2) calculating a disparity from the decision value; and (b3) using the disparity to find a pair of pixels from the left and the right digital image and calculating a distance from the disparity as taught by Onda "to provide a method of matching stereo images and of detecting disparity between these images, small in the volume of computations, compact in the hardware construction, quick in processing, highly reliable, and excellent in accuracy.", Onda, Col. 4, lines 57 – 61.

Response to Arguments

11. Applicant's arguments filed on 10/17/2007 with respect to **claims 1 – 15** have been respectfully and fully considered, but they are not found persuasive.

Summary of Remarks regarding **claim 1**:

Applicant argues that the Onda patent is totally silent on a systolic array having processing elements which can exchange information with two adjacent processing elements, while the Jeong publication (which shares an inventor in common with the present application) merely discloses left and right image conversion and not the claimed exchange of information between two adjacent processing elements.

Examiner's Response regarding **claim 1**:

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground of rejection. As shown above, Oh anticipates claim 1 for the newly added limitation of using a systolic array.

Summary of Remarks regarding **claim 14:**

Applicant argues Onda is completely silent on any configuration corresponding to the systolic array of the present invention, and further does not disclose the limitation of claim 14, "...comparing one scan line in one digital image of the left and the right digital image with multiple scan lines in the other digital image ... to match each pixel in the one scan line with a pixel in the multiple scan lines ..."

Accordingly, the prior art references including Onda and Jeong, alone or in combination, do not teach, suggest or even imply the limitations of claim 14; and thus, claim 14 is also patentable over the prior art references.

Examiner's Response regarding **claim 14:**

Applicant's arguments with respect to claim 14 have been considered but are moot in view of the new ground of rejection. As shown above, Oh anticipates claim 14 for the newly added limitation of using a systolic array, as well as FIG. 9B showing the comparison between one scan line from one digital image with multiple scan lines from the other digital image.

Summary of Remarks regarding **claim 3:**

Applicant argues Onda the Office Action alleges that "displ" and "disp2" stored in the layers exchange costs and active signals by adding in a histogram. However, Onda merely teaches that "displ" and "disp2" stored in the layers are only sent to some location where the histogram is made, which is not "exchange costs and active signals with each other." Accordingly, Onda fails to disclose or even imply that the recitation of claim 3 of the present invention, "two adjacent layers exchange costs and active signals with each other."

Examiner's Response regarding **claim 3:**

Applicant's arguments with respect to claim 3 have been considered but are moot in view of the new ground of rejection. As shown above, Oh in view of Jeong anticipates claim 3.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David P. Rashid whose telephone number is (571) 270-1578. The examiner can normally be reached Monday - Friday 8:30 - 17:00 ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571) 272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David P. Rashid/
Examiner, Art Unit 2624

David P Rashid
Examiner
Art Unit 2624

VIKKRAM BALI
PRIMARY EXAMINER